THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 100

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

RAPHAEL L. LEVIEN

Junior Party, [1]

v.

AKIHIRO KATAYAMA, HIDEFUMI OHSAWA and AKIKO FUKUHARA

Senior Party. [2]

Interference No. 103,587

Before CALVERT, URYNOWICZ and MARTIN, Administrative Patent Judges.

URYNOWICZ, Administrative Patent Judge.

[1] Application No. 07/476,060 filed February 6, 1990, now U.S. Patent No. 5,055,942 issued October 8, 1991. Unassigned. Reissue Application No. 08/183,694 filed January 19, 1994. Accorded Benefit of U.S. Application No. 07/476,060 filed February 6, 1990, now Patent No. 5,055,942, issued October 8, 1991. Unassigned.

[2] Application No. 07/957,825 filed October 8, 1992. Accorded Benefit of U.S. Application No. 07/875,210 filed April 28, 1992, now Patent No. 5,325,448 issued June 28, 1994; U.S. Application No. 07/270,809 filed November 14, 1988; Japan Application No. 62-289152 filed November 16, 1987 and Japan Application No. 62-289170 filed November 16, 1987. Assignors to Canon Kabushiki Kaisha.

FINAL JUDGMENT

The invention at issue in this interference relates to a method and apparatus for producing a halftone image. The particular subject matter in issue is illustrated by count 1, the sole count, as follows:

Count 1

A method of producing a halftone image comprising the steps of:

scanning a plurality of input points of an original image and generating a numerical value representing a shade of gray for each input point scanned;

outputting a screened image having a plurality of dots, each dot of said plurality of dots being one of black or white, the size of each plurality of dots being determined from a recursive relationship between a value of a current input point, a previous output, and an error representing a difference between a value of a previous input point and the previous output; and

transmitting signals representing the screened image to a marking device for making on an output medium.

The claims of the parties which correspond to the count are as follows:

Levien (patent) : Claims 1, 2. 6, 9-11, 14, 15, 18-20, 23, 25 and 26

Levien (reissue) : Claims 1, 2, 6, 9-11, 14, 15, 18-20, 23, 25, 26 and 28

Katayama et al. : Claims 32-43, 48, 49 and 53-55

Katayama et al. (Katayama) provoked this interference by copying certain claims of the Levien patent. Thereafter, but prior to declaration of this interference, Levien filed a reissue application in which independent claims 1 and 25 were amended for the purpose of distinguishing over a 1986 article by Fawcett et al.[3] and independent claims 27 and 28 were added to the application, of which claim 27 does not correspond to the count.

[3] G.S. Fawcett and B.F. Schrack, "Halftone Techniques Using Error Diffusion," 27 Proceedings of the Society for Information Display no. 4 (1986).

The interference was declared on September 12, 1995, with count 1 corresponding exactly to Katayama claim 32, and Levien patent and reissue claims 6.

During the period set for filing preliminary motions, Katayama filed a preliminary motion for judgment under 37 CFR § 1.633(a) on the ground that Levien's involved claims are unpatentable to Levien by virtue of Katayama U.S. Patent No. 5,325,448 under 35 U.S.C. § 102(e).

Levien filed two preliminary motions in the period provided. The first is a motion for judgment on the ground that Katayama's claims 32-41, 44-47 and 53-55 are unpatentable to Katayama for lack of support under 35 U.S.C. § 112, first paragraph. In support of this motion, Levien presented two declarations by Gonzalo Arce (Levien Record at 1-26) and Levien Exhibits L-1 to L-7 (LX 1-7). In opposition, Katayama presented a declaration of Tadashi Yoshida (Katayama Record at 1-20) and Katayama Exhibits K-2 to K-10 (KX 2-10). The second preliminary motion is for judgment on the ground that Katayama's claims 42, 43, 48 and 49 are unpatentable to Katayama under 35 U.S.C. §§ 102 /103 over Fawcett et al. (Fawcett).

In an order dated August 27, 1996 (Paper No. 38), the Administrative Patent Judge (APJ) deferred a decision on the three preliminary motions to final hearing.

Issues

In its brief filed March 4, 1997, Levien presented the following issues:

1. Whether the existence of the computer program code WAVY.BAS (LX-10) on November 12, 1987, combined with related testimony, establishes priority of invention by Levien by a preponderance of the evidence.

2. Whether the existence of a photograph (LX-9) on November 30, 1987, combined with related testimony, proves priority of invention by Levien by a preponderance of the evidence.
3. Whether Katayama should be denied the benefit of priority of its Japanese Application Nos. 62-289152 and 62-289170 and U.S. Application No. 07/270,809 for failure to provide a written description or enabling embodiment of the invention defined by the count.[4]
4. Whether Levien's preliminary motion under 37 CFR § 1.633(a) for judgment on the basis that Katayama claims 42, 43, 48 and 49 are not patentable to Katayama under 35 U.S.C. §§ 102/103 should be granted.
5. Whether Levien's preliminary motion under 37 CFR § 1.633(a) for judgment that Katayama claims 32-41, 44-47 and 53-55 are not patentable to Katayama under 35 U.S.C. § 112, first paragraph, should be granted.

Katayama presented the following issues in its brief filed April 7, 1997:

1. Whether Levien has proved conception coupled with diligence to an actual reduction to practice.
2. Whether the inference of suppression or concealment resulting from an over twenty-six month delay between Levien's alleged actual reduction to practice and the filing date of Levien's original U.S. patent application has been adequately excused.
3. Whether the involved claims of Levien are unpatentable over Katayama U.S. Patent No. 5,325,448, filed November 14, 1988.

[4] This issue was raised in a belated motion filed by Levien on January 2, 1997 (Paper No. 79)

4. Whether Levien's patent claim 25 is invalid under 35 U.S.C. § 112 and whether Levien's reissue claim 25 is invalid under 35 U.S.C. § 251.

Substitution of a New Count and Patentability of Newly Amended Claims

On May 2, 2000, the Board issued a notice under 37 CFR § 1.641 to the party Katayama that its corresponding claims 32-41 are unpatentable to it under 35 U.S.C. § 112, second paragraph, as failing to particularly point out and distinctly claim the subject matter which it regards as its invention (Paper No. 95). In that notice, Levien was notified that its corresponding patent and reissue claims 6, 9-11, 14, 15, 18-20 and 23 are unpatentable under 35 U.S.C. § 112, second paragraph, on the same grounds.

In response to the notice, the parties filed a joint preliminary motion under 37 CFR § 1.633(c)(1) and (c)(2) on June 20, 2000 to substitute a count and to amend the claims (Paper 98). That part of the motion to substitute a count was filed to overcome the indefiniteness of count 1. As noted above, count 1 corresponds exactly to Levien claim 6 and Katayama claim 32, which claims the Board found indefinite in the notice under 37 CFR § 1.641. In the motion, the parties agreed to present their respective proposals for a substitute count and to let the Board decide without opposition which proposed count would be best for resolving the issues in this interference. In order to overcome the rejections set forth in the Board's notice, Katayama amended its independent claims 32 and 37 (Appendix C to the joint preliminary motion), and Levien amended its independent claims 6 and 15 (Appendix D to the joint preliminary motion).

The preliminary motion is denied to the extent Katayama seeks to substitute its proposed count A for count 1; the motion is granted to the extent Levien seeks to substitute its proposed count B for count 1 and to the extent that the parties seek to amend their claims. Proposed count

A includes the language "the size of said plurality of dots." At page 3, lines 14-18, of its notice under 37 C.F.R. § 1.641, the Board found similar language reading "the size of each plurality of dots" indefinite because "[i]t could mean the number of dots in a plurality, or the total area of the dots in a plurality, or something else." Katayama did not challenge this position of the Board in its response to the notice under 37 CFR § 1.641. In contrast, Levien's proposed count B does not include such language or any other indefinite language specified in the Board's notice. Accordingly, proposed count A does not overcome all of the indefiniteness of count 1, whereas proposed count B does.

As a result of this decision, the interference is being redeclared in an accompanying paper by substituting count 2 corresponding exactly to Levien's proposed count B for count 1.

It is considered that Katayama claims 32-41, as amended, are indefinite under 35 U.S.C. § 112, second paragraph, because they include the term "the size of said plurality of dots." As indicated above, in the notice under 37 CFR § 1.641 the Board found similar language indefinite and Katayama did not oppose this position in its response to the notice. Accordingly, judgment in this proceeding will indicate that Katayama is not entitled to a patent with its amended claims 32-41.

It is considered that Levien's reissue claims 6, 9-11, 14, 15, 18-20 and 23, as amended in its response to the Board's notice, are allowable because the amendment of these claims has overcome their rejection under 35 U.S.C. § 112, second paragraph.

Katayama's Preliminary Motion under 37 CFR § 1.633(f)

for Benefit of Earlier Applications

Katayama filed with the joint preliminary motion a motion for benefit of its earlier U.S. Application No. 07/270,809, filed November 14, 1988 and its continuing U.S. Application

No. 07/875,210, filed April 28, 1992 (Paper No. 97). In the motion Katayama also sought benefit of its Japanese Application Nos. 62-289152 and 62-289170, both filed November 16, 1987. At page 11 of the motion, Katayama avers that Levien will not file a separate opposition to this motion and that the bases for Levien's opposition are set forth in Levien's belated motion to deny Katayama priority benefit of its Japanese applications, and in Levien's Brief for Final Hearing, beginning at page 17.

Katayama's motion for benefit is granted.

At pages 4-11 of its motion, Katayama presents Tables A-C to establish support for Levien Proposed Count B (count 2) in its prior U.S. and Japanese applications. We find the showing persuasive.

In its belated motion and brief, Levien's position consists of the argument that Katayama's prior applications do not teach "variable size dots." Levien relies on LX-16, two pages of Webster's New Dictionary and Thesaurus, to establish that "dot" means "a small spot" and that "spot" is defined as "a small area differing in color from the surrounding area."

Levien further argues that the number of background dots does not change as a result of Katayama's processing. Referring to KX 7-9, where KX-7 is a printout of a pattern of dots produced by prior art error diffusion processing and KX-8 and KX-9 are printouts of patterns of dots produced by Katayama's processing, the junior party argues that it can be seen from the dots in the respective circle B in each exhibit that, although Katayama's processing separates adjacent black dots into singularities as illustrated in KX-8 and KX-9, when comparing the total number of background white dots in the circle B of KX-7 with the total number of background white dots in the circle of KX- 8 or KX-9, the total number of white dots does not change as a result of Katayama's processing.

We agree with Levien that the total number of background white dots does not change in an area such as defined by circle B, and Katayama has provided no detailed analysis illustrating that the situation is otherwise. Nevertheless, this argument is not controlling because it does not establish that Katayama does not produce variable size dots.

Levien generates a variable size dot from a plurality of adjacent dots. Although Levien has no figure in its disclosure illustrating variable size dots, Levien's patent, at column 1, lines 38-40, indicates that U.S. Patent No. 4,012,584 teaches the technique of simulating gray shades by varying the size of dots. Figure 2 of the '584 patent shows a plurality of 18 adjacent dots (the 18 dots identified by "X" markings) forming a moderate size dot; Figure 6 of the patent shows a plurality of 8 adjacent dots forming a small dot; and Figure 8 shows a plurality of 30 adjacent dots forming a large dot. Katayama's technique in both its prior applications and its involved application is similar in that the size of dots produced is variable. For example, the lower halves of KX-8 and KX-9 most clearly illustrate variable size black dots and the upper halves of the exhibits illustrate variable size white dots. Some dots consist of but one dot while other dots consist of two, three, four or more adjacent dots. The dictionary definitions relied on by Levien do not exclude oblong areas as produced by Katayama as dots.[5]

Levien's Belated Motion to Deny Katayama Benefit of

Katayama's Japanese Applications under 35 U.S.C. § 119

The belated preliminary motion of Levien to deny the benefit accorded Katayama of the filing date of its earlier filed Japanese applications, said preliminary motion having been filed nearly ten months after the March 12, 1996 deadline for filing preliminary motions, is dismissed

[5] At paragraph 18 of the testimony of Raphael Levien, Levien testified to the effect that his image LX-12 comprises a printout of variable size elongated dots, each dot comprising adjacent pluralities of dots.

because we found, above, that Katayama is entitled to benefit of its prior applications with respect to count 2 in spite of Levien's argument to the contrary.

Patentability of Katayama's Claims 32-41, 44-47 and 53-55

Under 35 U.S.C. § 112, first paragraph

Levien's Position

Levien argues to the effect that each of amended claims 32-41 contains language wherein the size of a plurality of dots is determined based on a prior output and that Katayama is not entitled to copy such claims because in its disclosure the size of a plurality of dots is not determined from a prior output. Levien states that claims 53-55 expressly recite apparatus that generates or marks "variable size dots" and that Katayama does not disclose a variable size "dot." As before, Levien relies on LX-16, Webster's New Dictionary and Thesaurus, to show that "dot" means "a small spot" and that "spot" is defined as "a small area differing in color from the surrounding area." The junior party submits that since the white background in Katayama's processing contains contrasting black dots, the white background is not a "dot" by the above definition of "dot" (Decl. Arce, page 16, paragraph 37).

Levien takes the position that the copied claims should be interpreted in light of Levien's file history. The junior party asserts that when interpretation is required of a claim that is copied for interference purposes, the copied claim is viewed in the context of the patent from which it was copied. In re Spina, 975 F.2d 854, 856, 24 USPQ2d 1142, 1144 (Fed. Cir. 1992). It is urged that recent amendments to 37 CFR § 1.633(a) are not inconsistent with this principle of claim interpretation. Levien states that the file history of its involved patent makes it clear that determining the size of a plurality of dots means determining the size of a variable size dot.

Katayama's Position

Katayama's argument in opposition is that its application supports claims 32-41 as follows.

In highlight regions, the great majority of pixels are white. If the image is processed using error diffusion alone, black pixels are entirely surrounded by white pixels and may be in small clusters (e.g., two or three black pixels adjacent to each other as in KX-4, which illustrates an image produced by error diffusion processing of the prior art). When the Katayama invention is used, the highlight region changes in that small clusters of black pixels are broken up, such that the black pixels are separated from each other as in KX-5. Katayama concludes that when the first embodiment (Figs. 1-6) of its application is operating in a low-density highlight region, black dots are suppressed and separated, thus decreasing the numbers of dots in these sets of adjacent black dots. When this occurs, the numbers of dots in each of the neighboring sets of adjacent white dots are also changed. In the converse case, i.e., when the first embodiment is operating in a high density black region, black dots are caused to be printed and white dots are separated, thus decreasing the numbers of dots in those sets of adjacent white dots. When this occurs, the numbers of dots in the sets of adjacent black dots defined between the several white dots are also changed. It is urged that in either case, the recitation that the "size of the plurality of dots is determined" is clearly supported by the circuitry of the first embodiment of the Katayama application because the numbers of dots in the sets of adjacent white or black dots change as a result of the operation of that circuitry.

Katayama argues that the production of "variable size dots" in its claims 53 and 55 means the same thing as "determining the size of pluralities of dots" and, therefore, that these claims are

fully supported for the same reasons that the claims reciting "determining the size of pluralities of dots" are fully supported.

Opinion

Katayama's claims 44-47 are not designated as claims which correspond to the count and, accordingly, they are not involved in this proceeding. Thus, to the extent that Levien moves for judgment as to claims 44-47, the motion is dismissed.

The question of Katayama's support for its now amended claims 32-41 is dismissed because these claims have been found unpatentable under 35 U.S.C. § 112, second paragraph, as indefinite. See the third and fifth paragraphs under Substitution of a New Count and Patentability of Newly Amended Claims, above. An analysis of the patentability of claims under 35 U.S.C. § 112, first paragraph, is reached after it has been determined that the claims are particular and definite. In re Moore, 439 F.2d 1232, 1235, 169 USPQ 236, 238-39 (CCPA 1971).

Levien's position that the case of In re Spina, 975 F.2d at 856, 24 USPQ2d at 1144, is controlling on the issue of patentability of Katayama's claims, and that the claims must be interpreted in light of the file history of its patent is not well-taken. In Rowe v. Dror, 112 F.3d 473, 42 USPQ2d 1550 (Fed. Cir. 1997), a case like the one before us because it involved an issue of patentability raised under 37 CFR § 1.633(a), the court indicated that section 1.633(a) allows the U.S. Patent and Trademark Office (PTO) to consider the patentability of each application's claims as if the application stood alone. According to the court, under this situation, the PTO properly interprets a claim in light of the host disclosure, just as it would during ex parte prosecution. In the second footnote of Rowe, the court stated that Spina, unlike the case before it, did not involve a Rule 633(a) motion, and that the change of April 21, 1995 to the rule did not

conflict with the judicial precedent of Spina. Thus, Katayama's claims 53-55 will be construed in light of Katayama's specification.

Claims 53 and 54 call for means for generating variable size dots and claim 55 calls for a marking device which marks variable size dots. It is considered that Katayama's involved application supports these limitations for the same reason that we found, above, that Katayama's prior applications support the language "variable size dots" in count 2.

Patentabililty of Katayama's Claims 42, 43, 48 and 49

Levien asserts that the senior party's claims 42, 43, 48 and 49 are anticipated under 35 U.S.C. § 102 by the prior art to Fawcett (note 3, supra). In the alternative, Levien asserts the above claims are unpatentable under 35 U.S.C. § 103 as obvious over the combination of Fawcett and Floyd et al. (Floyd).[6] The junior party contends to the effect that all the positively recited limitations of the claims are met by Fawcett, or in the alternative, by the combined teachings of Fawcett and Floyd. It is urged that the term "variable size dot" at the end of the claims is in a whereby (or thereby) clause which is not normally considered part of the claimed combination. Citing Texas Instruments Inc.v. International Trade Commission, 988 F.2d 1165, 1172, 26 USPQ2d 1018, 1023 (Fed. Cir. 1993), Levien asserts that the functional language in a whereby clause which characterizes the result of the elements recited is not normally considered part of the claimed invention. Even if the whereby clause is part of the claimed invention and entitled to weight, Levien argues it still fails to distinguish over the prior art because it lacks any recitation that the size of the variable dots is controlled, or that the size is determined in a recursive relationship based on a prior output.

[6] R.W. Floyd et al., "An Adaptive Algorithm For Spatial Gray-scale, "17 Proceedings of the Society for Information Display 75-77 (1976).

Katayama's opposition is simply that the whereby (or thereby) clause contains actual functional recitations of structure or method, and that the clauses must be treated as substantive claim limitations in deciding questions of validity. Pac-Tec v. Amerace Corp., 903 F.2d 796, 801, 14 USPQ2d 1871, 1876 (Fed. Cir. 1990), cert. denied, 502 U.S. 808 (1991). The senior party's position is to the effect that the charge of unpatentability must fail because the prior art relied on does not teach marking or generating variable size dots.

We are of the opinion that Levien has not established that claims 42, 43, 48 and 49 are anticipated by Fawcett under 35 U.S.C. § 102 or unpatentable over Fawcett and Floyd under 35 U.S.C. § 103. A whereby clause is given no weight where the clause only expresses necessary or inherent results of what is recited in the claims. Texas Instruments Inc. v. International Trade Commission, 988 F.2d at 1172, 26 USPQ2d at 1023. Here the clauses in question do not express necessary results of what is recited in the claims because, although Levien has shown that Fawcett meets what is recited in the claims, Levien has not shown that the whereby and thereby clauses express necessary results of what is recited in the claims. Fawcett has not been shown to produce variable size dots, even though it meets the elements recited in the claims. Whereas Levien has not established that the subject matter of the whereby and thereby clauses are taught by Fawcett, the claims are not anticipated by this prior art. In view of the fact that Levien has not established that the subject matter of the clauses is taught by Fawcett or Floyd, or that it would have been obvious to modify the combined teachings of Fawcett and Floyd to include that subject matter, the junior party has not carried its burden of establishing the obviousness of the claims over the prior art.

Levien's Case for Priority

The Evidence:

The inventor, Raphael Levien, testified to the following effect.

In 1987, Raphael Levien lived at home with his parents. At that residence, he had lab equipment which consisted of a digital camera to capture digital images, a 286 computer to screen an image from the camera, and a laser printer for printout of the screened image. This equipment allowed him to make a printout of a captured image on the printer.

Dot 1 was a technique developed by Levien for printing out images to create halftones by computing an initial random halftone, then iteratively refining it by computing an error image, filtering the error image with a simple FIR filter, then adding the filtered error image to threshold values for computing the next iteration of the halftone. Eventually, after about 16 hours of iterations, the process would converge. By adjusting the parameters of the filter, it was possible to create a wide variety of effects, including variable size dots. However, graininess from the initial random halftone was a problem. Dot 1 also took an unacceptably long time to screen an image, that is, to process input signals from a digital camera to reproduce an image. Nevertheless, Dot 1 was an improvement in error diffusion screening and despite its problems, Dot 1 was incorporated into a complete commercial working system, which was actively marketed.

On November 8, 1987, Levien told his father, Jack Levien, that he could form halftone dots using prior outputs to create hysteresis in a recursive process and control the coarseness of the halftone dots. He told his father that hysteresis would increase the size of groups of dots by increasing the tendency of smaller dots to form a larger variable size dot. Raphael showed his

father printouts which he screened using several implementations of his idea. This concept was referred to as Dot 2.

The earliest written description of the invention is a program called WAVY.BAS. In 1996, a printout of WAVY.BAS was made and that printout is identified as LX-10. The program includes the date "11-12-87." Levien produced screened images using the program of LX-10 on the same day as it was written, November 12, 1987. The early wavy line (WAVY.BAS) version of Dot 2 and a later serpentine scan version used prior outputs in combination with a hysteresis constant to control the size of adjacent pluralities of dots forming a larger variable size dot.

An adaption of the program in LX-10 in C language is illustrated in LX-14. The program of LX-14 is the equivalent of the program of LX-10, which is written in BASIC. Raphael used the program of LX-14 to produce the screen of LX-13, which shows long strings of connected dots which form wavy lines. Smaller groups of dots form dot shapes in the highlight and dark regions of the gray scale. An actual image (LX-12) was screened using the wavy line version of Dot 2.

Raphael Levien's work to implement the idea for Dot 2 involved a series of experiments in which test patterns of dots were produced. After this work, Levien labored to produce screened full images. Subsequent to November 8, 1987, the printing of screened images occurred throughout the rest of that month. The earliest printout using Dot 2 that was saved is from a picture Raphael Levien took at his brother Alex's sixteenth birthday celebration on November 30, 1987 (LX-9). A picture was taken using the digital camera, and it was screened that day using the serpentine scan version of Dot 2. A 250% enlargement of the picture (LX-15) shows black dots clustered into pluralities of dots forming variable size black dots. In the dark

areas of the exhibit, the white dots are clustered into pluralities of dots forming variable size white dots.

The junior party did not file its patent application until February 6, 1990 due to a lack of funds. While Levien worked on developing Dot 2, a complete commercial system using Dot 1 was marketed in order to raise funds. In a further effort to raise funds, Levien and his father pursued licensing a previously filed patent application in another field. Funds to pay for the filing of that application came from Levien's father. They were successful in licensing that first patent to a large U.S. corporation in about September 1989, and Raphael Levien used the funds to pay for the filing of a patent application on Dot 2.

Jack Levien, the inventor's father, testified to the following effect.

When his son, Raphael, was 16 years old, he became interested in image screening and in error diffusion screening in particular. He received satellite news photos and printed out images captured from television signals. Raphael used a digital camera to capture images for his experiments and he was able to output small test images a few minutes after the images were captured. The camera was attached to his 286 computer so that he could freeze the image and print it out on a laser printer. The early printouts were recognizable but poor in quality.

His first significant improvement was called Dot 1. The improvement did not satisfy his goals in that Dot 1 took too long to print out images. Dot 1 was an improvement in error diffusion screening even though it took about an hour to produce an 8 by 10 inch screened image. Raphael tried for six months to improve on Dot 1.

Raphael disclosed the idea for a system called Dot 2 to his father at a restaurant on November 8, 1987, the date of his father's wedding anniversary. Raphael sketched a plan on a napkin of manipulating the pixel on top and both sides of a pixel using recursion and hysteresis.

He showed his father how he scanned two rows and used prior outputs with hysteresis to form adjacent groups of dots. The idea for Dot 2 was implemented through experiments. He planned a series of experiments in which he produced test patterns of dots. Then he performed many dot pattern tests to determine the effect of changing the value of the constant which controls the amount of hysteresis. The dot pattern tests were grey scale tests using a grey wedge that goes from zero to 100% along a grey scale.

Subsequent to November 8, 1997 and the dot pattern tests, Raphael printed screened images using Dot 2 throughout the whole month. He showed his father numerous test printouts. Raphael recently found a computer file written in BASIC called WAVY.BAS on the hard drive of his computer that he wrote when he first implemented an early version of Dot 2. Raphael showed his father a BASIC program printed from the WAVY.BAS computer program file, dated November 12, 1987. LX-8 is a photocopy of the label and markings on the hard disc drive which contains the WAVY.BAS computer program file. Raphael showed his father early printouts of Dot 2 screens which he called a wavy line screen or zebra line screen. The wavy lines were replaced with more traditional rounded dot shapes when Raphael substituted a serpentine scan for raster scan sometime between November 12 and 30, 1987. Because of his practice of screening images as soon as he wrote a program, he would have reduced his Dot 2 invention to practice as of November 12, 1987.

Jack Levien saved a printout screened with Dot 2 that was taken at his son Alex's sixteenth birthday celebration on November 30, 1987. Raphael took the picture using his digital camera. The camera was connected to a power supply and interfaced with his computer. Raphael immediately screened and printed out this picture using Dot 2. LX-9 is the image he

printed on that date. An enlargement was made from the original image, which enlargement is identified as LX-15.

Raphael had received a U.S. patent for an invention in another field and attempts were made to license that earlier patent. In September 1989 Raphael licensed the earlier patent to a large U.S. corporation. Using the money from the license, he filed his patent application on Dot 2.

Levien's Position

It is urged that Raphael Levien established corroborated conception of the invention on November 8, 1987 when he told his father about Dot 2.

The junior party asserts that the computer program WAVY.BAS is compelling evidence of a reduction to practice on November 12, 1987 because this Dot 2 program was actually used to print an image on that date.

It is argued that evidence that the program worked for its intended purpose is that a C program (LX-14), which is equivalent to the WAVY.BAS program, produced viewable images with a novel specialty effect of "wavy lines" (LX-13). Furthermore, an actual image which was screened using the WAVY.BAS algorithm is shown in LX-12, which establishes that WAVY.BAS was capable of working for its intended purpose.

It is alleged that the linking of a proven date of existence of the WAVY.BAS program and testimony that the inventor always printed out screened images as he finished writing a screening program in order to see the results proves that an actual reduction to practice is more likely than not to have occurred at the time. Further reason to believe that WAVY.BAS was used to print actual images on November 12, 1987 is the name of the computer file itself. The

name of the file makes it more probable than not that the file was used to make images on the above date because wavy is graphically descriptive of the images made.

Levien asserts a second reduction to practice occurred on November 30, 1987, when the print identified as LX-9 was taken. The junior party submits that the print shows a sixteenth birthday celebration for Levien's brother, Alex.

The junior party argues that it was diligent from prior to Katayama's entry into the field on November 16, 1987 to its reduction to practice on November 30, 1987. It is asserted that diligence toward reduction to practice is evidenced by the performance of numerous gray scale tests, then experimenting with parameter adjustments and finally making image printouts. The picture of November 30, 1987 identified as LX-9 was screened using the later developed techniques of serpentine scan and different prior dots (the dot above and the dot to one side). Changing the scan pattern and experimenting in the selection of different prior outputs occupied the efforts of Raphael Levien between his activity with WAVY.BAS on November 8, 1987 and the reduction to practice on November 30, 1987.

Katayama's Position

The senior party argues to the effect that Levien's case for conception is insufficient because (1) the junior party has produced no documents to corroborate conception on November 8, 1987 and nearly nine years passed between the events in question and Jack Levien's corroboration testimony, (2) the corroborator is the inventor's father and (3) Jack Levien failed to state whether or not the inventor's concept included the use of a recursive relationship between a value of a current input point, a previous output, and an error representing a difference between a value of a previous input point and a previous output.

According to Katayama, there is no evidence that the disclosure took place on November 8, 1987 rather than November 8, 1988 or 1989. With respect to the date of disclosure, the senior party asserts that the sole dated document, the program WAVY.BAS (LX-10), might have influenced Jack Levien's recollection but that the document is entitled to no weight because its date was under the sole control of the inventor until 1996.

Katayama opposes Levien's case for actual reduction to practice on November 12, 1987 asserting that the only evidence that anything was done on that date is the date "11-12-87" on the printout of the WAVY.BAS program made in 1996 and that the "11-12-87" date is not self-authenticating because the date was under the sole control of the inventor and has not been accompanied by any independent corroboration.

The senior party submits that the inventor has no actual recollection of reducing the invention to practice on November 12, 1987. The position is taken that the inventor relies on the "11-12-87" date to assume that the WAVY.BAS program was operational on that date and to then conclude that he must have screened an image that day because it was his practice to do so.

The argument is made that there is no independent corroboration of an actual reduction to practice because Jack Levien relies on the "11-12-87" date on the WAVY.BAS printout and his son's practice of screening images as soon as a program was written, to guess that there must have been a reduction to practice on November 12, 1987.

Finally, even if it is assumed for the sake of argument that WAVY.BAS was reduced to practice on November 12, 1987, Katayama argues that Levien has not shown that it performed a screening operation in accord with count 2. With respect to LX-12, it is urged that the generation of the "novelty effect as if viewing the subject through a window blind" (LR at 35, paragraph 18) cannot be considered an actual reduction to practice of the invention which

requires the control of the size of pluralities of dots, not wavy lines. WAVY.BAS produced wavy or jagged line artifacts, which would be unacceptable for normal image reproduction.

Concerning the second alleged actual reduction to practice, Katayama takes the position that even if it is assumed that the image shown in LX-9 was generated on November 30, 1987, the only evidence that it was screened in accordance with the method of count 2 is from the inventor himself. Jack Levien testified that the image was taken with a digital camera which was hooked up to the computer and printer. Although Jack Levien says the image was screened, there is no evidence that he knew what program was used to screen the image. The image itself (LX-9) does not make clear what kind of screening was performed.

Katayama contends that there is a delay of two years or more between the date of alleged actual reduction to practice and the filing date of the application which creates an inference of suppression and concealment. It is urged that Levien has not rebutted this inference by establishing a justifiable excuse for the delay. The senior party avers that Levien offers no evidence such as financial statements, or a statement by his father that the inventor lacked funds to file a patent application during the time in question. Even if the inventor had no funds, Katayama contends no case supports the proposition that lack of funds is a sufficient excuse for an unusual delay in filing a patent application. Whatever funds Levien had were admittedly directed either to commercializing Dot 1 or Dot 2 instead of being applied to filing a patent application directed toward Dot 2, and neither of these diversions of funds is a justification for the delay in filing an application on Dot 2. Katayama asserts that Jack Levien purchased state-of-the-art equipment for his son's lab, and submits there is no evidence of whether or not the father would finance the filing of a patent application once his son purportedly reduced the invention to practice. The senior party contends that there was no thought of patenting Dot 2

until September 1989 when, after licensing the earlier patent, the inventor asked his father what he should do with the proceeds. It was his father who suggested that he file patents on his other ideas. Lastly, Katayama asserts that the inventor's testimony that he did not file an application on Dot 2 because he was attempting to commercialize this invention is an insufficient excuse. The senior party submits it is well established that commercial development of an invention can never excuse an unreasonably long delay in filing a patent application. Lutzker v. Plet, 843 F.2d 1364, 1367-68, 6 USPQ2d 1370, 1372 (Fed. Cir. 1988).

Opinion

Where an interference is between a patent that issued on an application that was copending with an interfering application, the applicable standard of proof is preponderance of the evidence. Bosies v. Benedict, 27 F.3d 539, 541-42, 30 USPQ2d 1862, 1864 (Fed. Cir. 1994). Accordingly, Levien must establish that it was the first inventor by a preponderance of the evidence.

It is considered that the junior party has not established conception of the subject matter of count 2 at any time prior to its filing date. Count 2 requires "a recursive relationship between a value of a current input point, a previous output, and an error representing a difference between a value of a previous input point and the previous output." Although Jack Levien testified to the effect that on November 8, 1987 his son, Raphael, disclosed a plan to him which utilized recursion and prior outputs, that testimony is deficient in that Jack Levien did not testify that this recursion was the specific recursion set forth in the count. The corroborator's testimony says nothing about a recursive relationship involving a value of a current input signal or an error representing a difference between a value of a previous input point and the previous output. To

establish conception, a party must show possession of every feature recited in the count. Coleman v. Dines, 754 F.2d 353, 359, 224 USPQ 857, 862 (Fed. Cir. 1985).

Even if the corroborating witness had indicated that the inventor, Raphael Levien, possessed every limitation of the count on November 8, 1987, his testimony would not have been persuasive with respect to prior conception. The fact that the corroborating witness Jack Levien is closely related to the inventor goes to his credibility or weight of his testimony, but it does not disqualify him or render him incompetent to testify as a corroborating witness. However, relatives of a party are considered as being biased in the party's favor, unless it appears that they have an adverse interest. III Rivise and Caesar, Interference Law and Practice, §§ 504, 551 (Michie Co. 1947). Here, Raphael's father had no adverse interest and his testimony is considered as being biased in his son's favor. Furthermore, the invention is complex and Raphael's father was not shown to be skilled in the particulars of the field of the involved invention such that he understood what was disclosed to him, and he testified to a large extent from memory long after the occurrences of which he spoke, approximately nine years after. McKnight v. Pohle, 22 App. D.C. 219, 1903 Comm'r 619, 105 Off. Gaz. 977 (Appeals D.C. 1903); III Rivise and Caesar, Interference Law and Practice § 552 (Michie Co. 1947). No contemporaneous document was produced by the junior party to establish what, if anything, was communicated to the corroborator by the inventor on November 8, 1987.

Alone, the fact that the sole corroborating witness is the inventor's father does not defeat Levien's case for priority and it is considered that such testimony under other circumstances could establish conception. However, we are of the opinion that when all of the above weaknesses of the corroborator's testimony are considered together, his testimony as a whole is insufficient to establish that Raphael Levien disclosed to him even the incomplete conception

comprising a plan of manipulating a pixel on top and both sides of a pixel using recursion, prior outputs and hystersis on November 8, 1987. An inventor must prove conception by corroborating evidence. Burroughs Wellcome Co. v. Barr Labs. 40 F.3d 1223, 32 USPQ2d 1915 (Fed. Cir. 1994).

We are also of the opinion that the party Levien has not established actual reduction to practice at any time prior to its filing date. Levien's case for actual reduction to practice fails for the same reasons that its case for prior conception fails. The testimony of the sole corroborating witness, Jack Levien, does not establish that the variable size of each plurality of adjacent dots was determined from a recursive relationship involving, inter alia, a value of a current input signal and an error representing a difference between a value of a previous input point and the previous output. A party seeking to establish actual reduction to practice must show that it constructed an embodiment that met every element of the count. Eaton v. Evans, 204 F.3d 1094, 53 USPQ2d 1696 (Fed. Cir. 2000). Furthermore, the testimony of Jack Levien is unpersuasive because of the complexity of the invention and the fact that it has not been shown that he was skilled in the particulars involved such that he understood and would be able to recall what he actually saw, he was the inventor's father, and he testified largely from memory some nine years after the occurrences of which he spoke. The requirement for independent corroboration of actual reduction to practice is well established. Reese v. Hurst v. Wiewiorowski, 661 F.2d 1222, 211 USPQ 936 (CCPA 1981).

There is no corroboration that the WAVY.BAS program of LX-10 would determine the variable size of each of a plurality of adjacent dots from a recursive relationship between a value of a current input, a previous output, and an error representing a difference between a value of a previous input point and the previous output. Furthermore, there is no corroboration that the

program was actually used by Raphael Levien to produce his images. As noted by the senior party, the program was under the sole control of the inventor. Jack Levien's knowledge of the specific program of LX-10 first occurred in 1996 when the exhibit was made, and this is long after the alleged dates of actual reduction to practice in 1987.

Whereas Levien has not established that it was first to conceive, the issue of reasonable diligence on the part of the junior party is moot.

Although we are of the opinion that the junior party has not established its case for priority, we are of the opinion that the activities of Raphael Levien directed toward his alleged conception, actual reduction to practice and diligence occurred in 1987. It is considered that the year is fixed by the celebration of his brother Alex's sixteenth birthday on November 30, 1987. The image LX-9 shows Alex at the celebration holding a birthday cake with the number "16" thereon.

Even if the party Levien had established an actual reduction to practice prior to its filing date, it is considered that Levien would not be entitled to prevail because there is an unreasonable delay of over two years between the alleged actual reduction to practice in November 1987 and the filing of its patent application in February 1990 which raises an inference of suppression and concealment, and because that inference has not been rebutted.

As stated in Shindelar v. Holdeman, 628 F.2d 1337, 207 USPQ 112 (CCPA 1980) and Peeler v. Miller, 535 F.2d 647, 190 USPQ 117 (CCPA 1976), an unreasonable delay between actual reduction to practice and the filing of an application (constructive reduction to practice) may raise an inference of intent to suppress the invention. A certain specified length of time may not be considered per se unreasonable, but rather each case involving the issue of suppression or concealment must be considered on its own particular set of facts. Shindelar v. Holdeman, 628 F.2d at 1343, 207 USPQ at 117.

In the present case, Levien has little in the way of activity which took place during the period of delay. Levien relies heavily on an alleged lack of funds as an excuse for not having filed his application sooner. However, Levien has cited no case which supports the proposition that lack of funds is a sufficient excuse for delay in filing a patent application and we are of the opinion that a lack of funds is not a sufficient excuse.

Furthermore, the testimony of the corroborating witness Jack Levien as to the inventor's activity after November 1987 is limited to paragraph 17 of his testimony. That testimony is meager. It does not corroborate Raphael's testimony that he did not file a patent application until February 6, 1990 due to lack of funds. In essence, it indicates that his son licensed an earlier invention to a U.S. corporation in September 1989, that he told his son to use the funds from the license to "file patents on his other ideas" and that after the funds were received, Raphael had the funds to pay for filing the patent application that evolved into his involved patent. There is no other corroborated activity. Most notably, there is no corroborating evidence that the inventor lacked the funds prior to licensing his patent to file an application for patent on the involved invention; the corroborating testimony merely indicated that Raphael Levien used funds from the license to file his application. Even assuming Raphael lacked the funds needed to file his patent application, there is no evidence that Raphael attempted to obtain funding within a reasonable time after November 1987 and failed. The licensed patent referred to in the testimony is not identified in the record, and it may be that it could have been licensed at an earlier date if Raphael were in need of funding.

Taking the facts and circumstances of this case into consideration, including the fact that Raphael Levien was a young man at the time in question and resided with his parents at the time of his alleged actual reduction to practice, we conclude that the period of about 27 months

between Levien's alleged actual reduction to practice and the filing of its application was such an unreasonable delay as to raise an inference that Levien intended to suppress or conceal the invention. The belated activity of the junior party in September 1989 in that period is insufficient to overcome the inference. Although the inventor was a young man at the time, the fact that he filed a patent application to another invention substantially before filing the application which evolved into his involved patent, shows that he was aware of the importance of filing for patent protection. The courts have implemented a public policy favoring, in interference situations, the party who expeditiously starts his invention on the path to public disclosure through the issuance of patents by the filing of patent applications. Peeler v. Miller, 535 F.2d at 655, 190 USPQ at 123.

Patentability of Levien's Patent and Reissue Claims

Katayama charges (1) that Levien's involved patent and reissue claims are unpatentable to Levien under 35 U.S.C. § 102 as anticipated by Katayama U.S. Patent 5,325,448, (2) that Levien patent claim 25 is invalid under 35 U.S.C. § 112, first paragraph, as not enabled, and (3) that Levien reissue application claim 25 is invalid under 35 U.S.C. § 251 because it is based on a defective reissue declaration. Whereas Katayama is entitled to prevail in this proceeding, these matters are dismissed as moot.

Judgment

Judgment as to the subject matter of count 2, the sole count, is hereby awarded to Akihiro Katayama, Hidefumi Ohsawa and Akiko Fukuhara, the senior party. On the present record, the party Katayama et al. is entitled to a patent with claims 42, 43, 48, 49 and 53-55; the party Katayama et al. is not entitled to a patent with claims 32-41. The party Levien is not

entitled to its patent with claims 1, 2, 6, 9-11, 14, 15, 18-20, 23, 25 and 26; the party Levien is not entitled to a patent with its application claims 1, 2, 6, 9-11, 14, 15, 18-20, 23, 25, 26 and 28.

IAN A. CALVERT Administrative Patent Judge	)	
STANLEY M. URYNOWICZ, JR. Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
JOHN C. MARTIN Administrative Patent Judge	)	

SMU:clm

Attorney for Levien:

Allan J. Jacobson
Intellectual Property Law
13310 Summit Square Center
Route 413
Doublewoods Road
Langhorne, PA 19047

Attorneys for Katayama et al.:

Fitzpatrick, Cella, Harper & Scinto
30 Rockefeller Plaza
New York, NY 10112-3801